

WHAT IS CLAIMED IS:

1. A recombinant procollagen polypeptide chain comprising a natural collagen polypeptide chain, a first propeptide, and a first non-natural site-specific proteolytic agent recognition site, wherein said first non-natural site-specific proteolytic agent recognition site is located between said collagen chain and said first propeptide.

2. A recombinant procollagen chain according to claim 1, wherein said first non-natural site-specific proteolytic agent recognition site is a site-specific protease recognition site.

3. A recombinant procollagen chain according to claim 1, wherein said first non-natural site-specific proteolytic agent recognition site comprises a peptide bond labile to chemical hydrolysis.

4. A recombinant procollagen chain according to claim 1, wherein said first propeptide is a C-terminal propeptide.

5. A recombinant procollagen chain according to claim 1, wherein said first propeptide is a natural procollagen C-terminal propeptide.

6. A recombinant procollagen chain according to claim 1, further comprising a second propeptide and a second non-natural site-specific proteolytic agent recognition site, wherein said second non-natural site-specific proteolytic agent recognition site is located between said collagen chain and said second propeptide.

7. A recombinant procollagen chain according to claim 6, wherein said first and said second non-natural site-specific proteolytic agent recognition sites are different.

8. A recombinant procollagen chain according to claim 1, further comprising a non-natural amino acid sequence between said first site-specific proteolytic agent recognition site and said collagen chain.

9. A recombinant procollagen chain according to claim 1, further comprising a non-natural amino acid sequence between said first site-specific proteolytic agent recognition site and said first propeptide.

10. A nucleic acid encoding a recombinant procollagen chain according to claim 1.

11. A vector comprising the nucleic acid sequence of claim 10 operably linked to a transcription regulatory element not naturally linked to said nucleic acid.

12. A cell comprising a nucleic acid according to claim 10 operably linked to a transcription regulatory element not naturally linked to said nucleic acid.

13. A recombinant collagen polypeptide chain comprising a terminal decapeptide having a non-natural amino acid sequence.

14. A recombinant collagen polypeptide chain produced by contacting a recombinant procollagen chain according to claim 1 with a first site-specific proteolytic agent capable of selectively cleaving said procollagen chain at said first site-specific proteolytic agent recognition site.

15. A collagen composition comprising a plurality of recombinant collagen chains according to claim 14, wherein said chains are polymerized.

16. A sterile, nontoxic, biocompatible collagen composition comprising a recombinant collagen chain according to claim 14.

17. A process for the production of a recombinant procollagen polypeptide chain, said process comprising the steps of:

culturing a cell according to claim 12 under conditions suitable for the expression of said nucleic acid; and

recovering said recombinant procollagen chain.

18. A process for the production of a recombinant collagen polypeptide chain, said process comprising the steps of:

contacting a recombinant procollagen chain according to claim 1 with a site-specific proteolytic agent capable of selectively cleaving said recombinant procollagen chain at said first site-specific proteolytic agent recognition site under conditions wherein said first site-specific proteolytic agent selectively cleaves said procollagen chain at said first site-specific proteolytic agent recognition site, whereby a collagen chain is produced; and recovering said collagen chain.

19. A method of promoting the growth of cultured cells on a solid substrate or the adherence of cultured cells to a solid substrate, said method comprising contacting said solid

substrate with a composition according to claim 16.

20. A method of augmenting localized tissue in a host, said method comprising the step of subcutaneously administering to a host a collagen composition according to claim 16.

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